Electronic Version
Stylesheet Version v1.1.1

Claims

[c1] A well logging tool, comprising:
a housing;
at least one piston moveably disposed on the housing;
at least one sensor disposed on the at least one piston;
a pressure compensation system operatively coupled to the at least one piston such that a pressure at a back side of the at least one piston is substantially identical to a pressure outside the well logging tool; and
a piston deployment mechanism for deploying the at least one piston.

[c2] The well logging tool of claim 1, wherein the piston deployment mechanism comprises a piston spring disposed at the back side of the at least one piston.

[c3] The well logging tool of claim 1, wherein the pressure compensation system comprises a pressure-compensating chamber having an opening to an exterior of the housing, a fluid-filled reservoir, and a compensating piston moveably disposed between the pressure-compensating chamber and the fluid-filled reservoir such that a pressure inside the pressure-compensating chamber and a pressure inside the fluid-filled reservoir

are substantially identical.

[c4] The well logging tool of claim 3, further comprising a compensating spring connected to the compensating piston for exerting a force on the compensating piston.

[c5] The well logging tool of claim 4, wherein the piston deployment mechanism comprises a piston spring disposed at the back side of the at least one piston.

[c6] The well logging tool of claim 1, further comprising at least one piston liner moveably disposed between the housing and the at least one piston for extending a reach of the at least one piston.

[c7] The well logging tool of claim 4, further comprising a controller connected to the compensating spring for regulating the force exerted by the compensating spring.

[c8] The well logging tool of claim 7, wherein the controller is operated by a motor.

[c9] The well logging tool of claim 7, wherein the controller is operated by hydraulic pressure of drilling fluids.

[c10] A well logging tool, comprising:
a housing;
at least one piston moveably disposed on the housing;
at least one sensor disposed on the at least one piston;

means for keeping a pressure at a back side of the at least one piston substantially identical to a pressure outside the well logging tool; and
means for deploying the at least one piston.

[c11] A method for well logging using a well logging tool having at least one piston disposed on a tool housing and a pressure compensating system that maintains a pressure at a back side of the at least one piston to be substantially identical to a pressure outside the well logging tool, wherein the at least one piston includes at least one sensor, the method comprising:
disposing the well logging tool in a borehole;
deploying the at least one piston to establish contact between the at least one piston and a wall of the borehole; and
measuring a formation property using the at least one sensor.

[c12] The method of claim 11, wherein the deploying comprises exerting a force on the back side of the at least one piston by a spring.

[c13] The method of claim 11, wherein the deploying comprises using a hydraulic pressure of a drilling fluid.

[c14] The method of claim 11, the measuring was performed

while drilling.

[c15] The method of claim 11, wherein the at least one sensor is selected from a temperature sensor, a pressure sensor, a resistivity sensor, an inductive imager, a density sensor, a neutron sensor, a sonic sensor, a nuclear magnetic resonance sensor, a dipmeter, and a seismic sensor.